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Use of Communications Sources: An Intercultural Investigation of Practices in the U.S. and Russia

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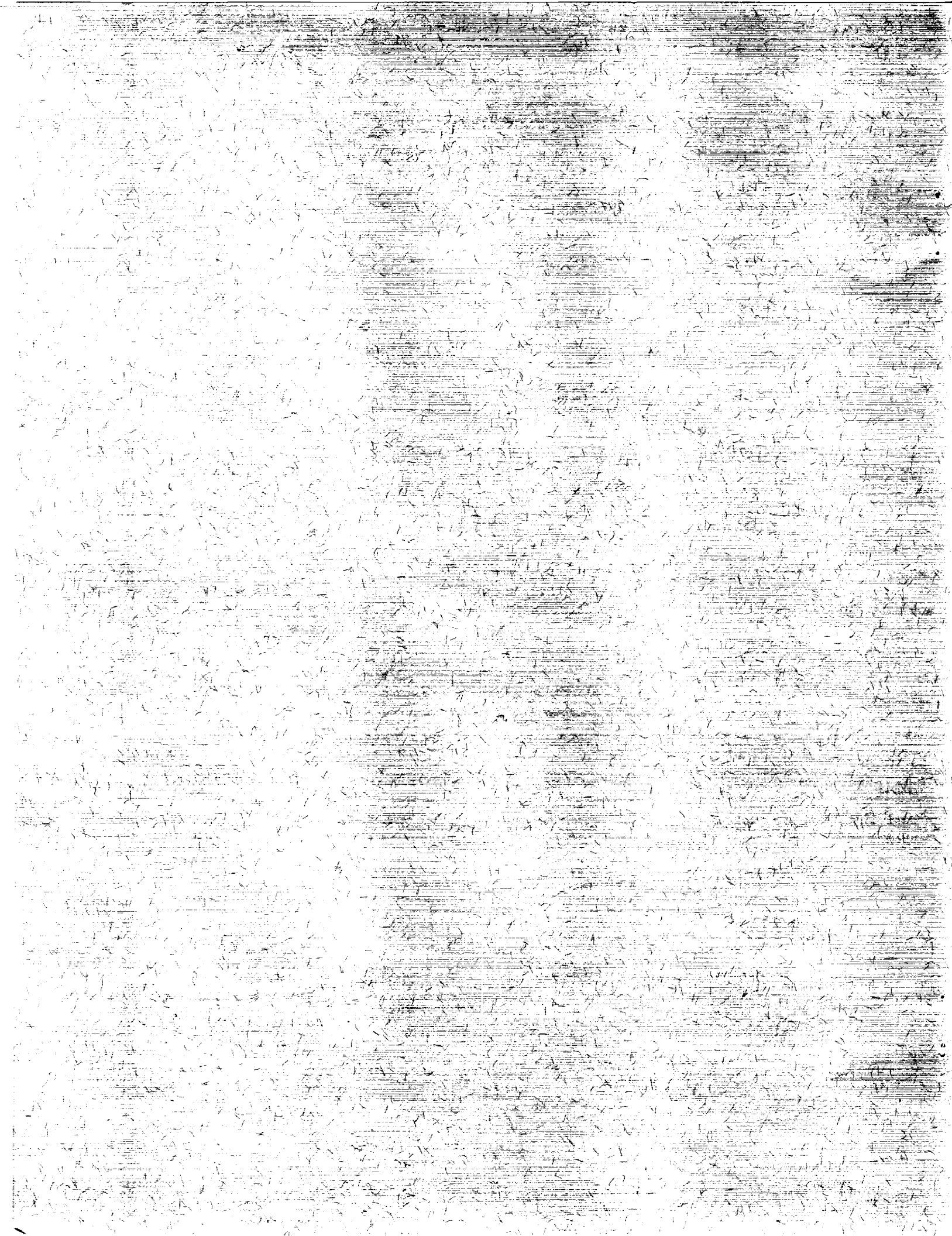

Use of Communications Sources: An Intercultural Investigation of Practices in the U.S. and Russia

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The purpose of this paper is to investigate the impact of U.S./Russian cultural differences in communications among scientists and engineers in applied technology industries. This is important because the advent of *perestroika*, the breakup of the Soviet Union, and massive moves toward privatization make Russia a potential partner in economic endeavors and, at the same time, a possible competitor in the international arena.

Unfortunately the results of U.S./Soviet collaborative endeavors have not always met with expectations. Since 1987, when the former USSR adopted a law on joint ventures, evidence has emerged as to the causes of many failures of these cooperative arrangements. While international strategic alliances face many structural barriers, failures of these cooperative ventures have often resulted from a lack of understanding of the more intangible barrier of major differences in cultural environments between the partners (Cattaneo, 1992). Cultural differences not only affect business operations but also raise questions for scholars and practitioners who have advocated that U.S. management theories apply abroad. Boyacigiller and

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Adler (1991), Doktor, Tung, and Von Glinow (1991), and Hofstede (1993) observed that most U.S. scholars have continued to export management concepts and practices abroad assuming the concepts were universally valid despite the fact that Western organizational theory has placed little emphasis on factors such as history, social setting, culture and government (Boyacigiller & Adler, 1991).

High technology industries such as aerospace, which includes the commercial aviation segment, have characteristics that make the industry an excellent platform to study cultural implications for technical communications. The investigation of this group is worthwhile for several reasons. First, high technology industries are becoming more international and more engaged in collaborative endeavors. Second, the industries are highly dependent on effective innovation diffusion which, according to Fischer (1979), is essentially information exchange. And, third, studies of innovative project management have found that information availability was a critical factor in project success or failure (e.g., Link & Zmud, 1987; Tushman, 1978, 1979).

We propose that a gap in the literature exists that centers on whether U.S. paradigms of communications behavior apply to other cultures. First, we will explore early findings in the U.S. that held that the choice of an information source was a function of the "law of least effort" rather than quality (e.g., Allen, 1977; Culnan, 1983; DeWhirst, 1971; Hardy, 1982; O'Reilly, 1982; Rosenberg, 1967). Second, we will explore the contingency approaches such as that of Tushman (1979) and the later work of Daft and Lengel (1984, 1987), Huber and Daft (1987) and Lengel and Daft (1988) who held that information choice was a function of the nature of the task at hand. A third issue to be addressed is the confounding problem of presumed differences between scientists and engineers in information gathering behavior (Allen, 1977). Finally, we will investigate whether cultural differences cast doubt on the applicability of findings from U.S. situations to other cultures.

BACKGROUND

Universal Approaches to Information Seeking Behavior

Universal approaches to information seeking behavior have sought to establish behavioral patterns without regard to contingencies. Early work by Mintzberg (1973, 1975) found that U.S. managers favored informal, personal, verbal sources of communications rather than print media. This finding is consistent with work of several decades of investigation in U.S.

organizations that have, for the most part, yielded a "law of least effort" preference for information. That is, criteria for information used in solving of both managerial and technical issues rests in sources that are readily accessible or easy to use rather than the quality of the information obtained (e.g., Allen, 1977; Culnan, 1983; DeWhirst, 1971; Hardy, 1982; O'Reilly, 1982; Rosenberg, 1967).

The preference for the "least effort" criterion over quality was explained in part by O'Reilly (1982). He held that, first, individuals may incur both social and economic costs in searching for information that might not be readily available. Next, pressure to produce results may result in accessibility dominating quality as a determining factor for use of information sources. Other reasons for choosing "least effort" sources include organizational structures that can restrict access to high quality valued sources and incentive systems that reward members for seeking information from a particular source while punishing them for seeking information from other sources. Finally, because information in organizations is often incomplete, vague, and subject to multiple interpretations, users tend to rely on sources used over time that are considered accessible.

Contingency Approaches to Information Seeking Behavior

Later, a second stream of research focused on information seeking behavior as a function of the task. Tushman (1979) examined the role of task "routineness" in communications in R&D settings. Later, Daft and Lengel (1984, 1987), Huber and Daft (1987), and Lengel and Daft (1988) proposed that information channel choice was contingent on the task. According to Daft and Lengel, the information capacity of a channel (the means by which a source is accessed by a user) depends on (1) the opportunity for timely feedback, (2) the ability to convey multiple cues, (3) the tailoring of messages to personal circumstances, and (4) language variety. Daft and Lengel identified a dimension of "richness" or the capacity of information to change understanding. Thus the "richest" channel was face-to-face interaction, followed by video-phone, electronic mail, personally addressed documents, and unaddressed documents. They found that managers and technical personnel preferred face-to-face communications when dealing with complex problems. On the other hand, written media were generally used in handling less complex, more routine problems (Covaleski, 1985). A later work of Gales, Porter and Mansour-Cole (1992) at least partially upheld task contingencies of routine/nonroutine in a study of information choices of R&D managers.

A second communications contingency focused on a narrower area–the effectiveness of information seeking behaviors during new product devel-

opment (Cooper & Kleinschmidt, 1986; Johne, 1984). This stream of work suggested that effective information seeking behavior varies in differing stages of product innovation.

Finally, demographic factors have also been suggested as having a role in information behavior. Price (1970) suggested that oral (nondocumentary) communication networks (sometimes referred to as "invisible colleges") were sustained by personal contacts among specialists who have closely related interests. Parnoff (1981) proposed that the use of "invisible college" sources was related to personnel mobility and higher education. This was confirmed by Keller and Holland (1978), who studied U.S. professional personnel in three applied R&D organizations. They found a positive significant relationship between a respondent's level of education and scientific and technological information excellence. Other Western studies have concluded that career mobility from one organization to another was the most effective way of ensuring dissemination and assimilation of new technology to those who are unfamiliar with it (Langrish et al. cited in Parnoff, 1981).

Information Seeking Behavior of Scientists and Engineers

Still another contingency factor is the argument that scientists and engineers pursue quite different paths in seeking information.

Work by Allen (1977, 1988) and Jackson (1976) argued that engineers and scientists differed in the manner in which they consumed, transformed, produced, and exchanged information. Allen found that engineers spent less project time communicating than scientists. Further, he held that scientists spent more than twice their project time in literature use than engineers. He reported that the major source of an engineer's ideas used for potential solutions to technological problems was non-customer personal contacts. If the material was not available in his or her personal store of knowledge, the engineer sought it from either a colleague or an outside expert. Rarely did an engineer resort to aids such as a library assistant or bibliographic sources. Allen and Hauptman (1994) also noted that knowledge was best transferred to engineers by personal contacts. Thus, an engineer's connection to literature and documentation was best made with the aid of intermediaries known as *technological gatekeepers* (Allen, 1977; Allen & Cohen, 1969) or those persons who link the organization to the outside world of scientific and technological knowledge.

These contentions were partially upheld in a 1980 (Mick, Lindsey & Callahan) work that concluded that scientists were more print oriented and used scholarly literature as a primary source whereas engineers predominantly preferred the practical press and mostly informal sources of

information, particularly conversations with individuals within the organization. In contrast, engineers were found to be more disposed to solve problems alone or with the help of colleagues rather than seeking answers in the scholarly literature. However, Mick and his associates found that when considering comparable tasks and job types, scientists and engineers displayed similar behavior in their choice of information sources. The question of whether industry characteristics rather than the engineer/scientist dichotomy affected research findings was examined also by Rosenberg (1967) who found no differences in information gathering methods between research and nonresearch professional personnel in six industry and government organizations. Later, Pinelli (1991) reported that U.S. aerospace engineers and scientists expressed similar information source preferences for the accessible and the interpersonal (as opposed to written).

Cultural Differences

A fast growing body of literature has investigated the question of whether national culture transcends organizational culture from several perspectives (e.g., Hall, 1976; Hofstede, 1980, 1983, 1985, 1991; Schwartz & Bilsky, 1987; Triandis, 1996; Trompenaars, 1994). Most of the literature focuses on differences in managerial values and attitudes. Very little cultural research has been carried out among R&D personnel. One exception is the work of Hoppe (1993) who found that U.S. R&D managers had work values that were similar to other U.S. managers. No studies could be found that addressed cultural differences in the communication of scientific and technical information.

Perhaps one of the most important questions arising from cultural research is whether cultures, over time and through interaction, change over time (convergence theory), remain the same (divergency theory), or absorb elements of various cultures (cross-vergence theory). Some evidence exists for a convergence of cultures over time due to economic advancement and increased communication (Hofstede, 1985). But Hofstede concluded that this has been upheld only in an increase in individualism and only in countries that have become richer. He also held that little evidence existed concerning international convergency over time and that cultural diversity will not only remain but may be increasing.

The Hofstede Paradigm

The most comprehensive study of cultural differences in work-related values and attitudes came from Hofstede (1980, 1983) who investigated

the work related values of 116,000 people in IBM companies in 50 countries. He explored the question of whether, for example, Dutch employees at an IBM facility in Amsterdam would be influenced more by Dutch culture than by IBM's culture. His results held that national culture was more influential in managerial practices than organizational culture. To explain his findings, Hofstede identified four dimensions of national cultural differences–power distance, uncertainty avoidance, individualism, and masculinity. A fifth dimension of the "Confucian dynamic" was added by The Chinese Connection (1987). Hofstede (1994) provided an alternative term for this fifth dimension–long-term versus short-term orientation (see Table 1 for a brief description of each dimension).

The five dimensions have important implications for members of a culture. Power distance examines the role of interpersonal power between superiors and subordinates or how a society handles inequality among its members. High uncertainty avoidance cultures attempt to overcome future uncertainty by developing institutions that avoid risk. Weak uncertainty-avoidance societies are not threatened by future uncertainty and do not have such norms and institutions. Individualism (as opposed to collectivism) reflects the importance placed on the individual rather than the collectivity. Organizations with high levels of individualism emphasize individual achievement and competition. Highly collectivist societies emphasize group achievement and cooperation within the organization. Further, in individualistic cultures, organizational sub-units probably will communicate with each other about matters of mutual interest whereas, in collectivist cultures, information is viewed as a resource not to be shared with outgroups (Gudykunst, Yoon & Nishida, 1987).[1] Wagner (1995) also concluded that collectivist cultures frequently cooperated in groups and members of individualistic national cultures tended to avoid cooperation. The masculinity vs. femininity dimension is sometimes referred to as quantity vs. quality of life. In a high masculine culture, the predominant socialization pattern is for men to be assertive and women to be nuturant. Masculine cultures endorse goals, are oriented toward assertiveness, and value the acquisition of wealth and goods. The long- and short-term orientations contain dimensions of work ethic and face saving respectively. In long-term oriented cultures, the work ethic promotes perseverance and hard work. In short-term oriented societies, the idea of "face" favors preserving one's and others' dignity and social status.

Cultural Differences and Communications

Cultural dimensions have, to a lesser extent, been explored from a standpoint of organizational communications. Prominent theoretical

TABLE 1. Hofstede's (1980) and The Chinese Connection's (1987) Paradigm of Intercultural Dimensions

Power distance is the degree to which a society accepts differences in power in an organization, specifically superior/subordinate relationships. In low-power cultures there exists little difference between the power of managers and subordinates, and subordinates prefer participation in decisions that affect work performance.

Uncertainty avoidance refers to the degree to which a people in a society feel threatened by ambiguous situations. This dimension measures the degree to which a culture dislikes uncertainty or risk and thus attempts to reduce or avoid it.

Individualism refers to a people's tendency to fend for themselves. A society that values individualism is one wherein ties between individuals are loose and everyone is expected to watch after his or her own interests. In contrast, in collectivist societies people are expected to look after each other. Where collectivism predominates, individuals interpret organizational relationships from a moral perspective; thus a bond of responsibility develops between the employee and employer.

Masculinity refers to the degree of assertiveness and materialism valued by a society as contrasted to concern with quality of life. A high masculine society values assertiveness, acquisition of money, and disregard for others. Low masculine societies ("feminine" societies) value cooperation, quality of life, and approval of the "underdog."

Confucian dynamism refers to a range of Confucian values. At one pole, values include a dynamic, future-oriented mentality such as persistence, hard work, thrift and regard for relationships. At the opposite pole, values are that of a static mentality such as reciprocity, tradition and a focus on the past and present.

orientations in this area arise from the work of Hall (1976) and Hofstede (1980).

Hall (1976) differentiated cultures on whether they used high- or low-context communications. He defined a high-context communication as one in which "most of the information is either in the physical context or internalized in the person, while very little information is carried in the coded, explicit, transmitted part of the message." In contrast, a low-context communication is one in which "the mass of information is vested in the explicit code" (p. 79). Hall identified the U.S. as a low-context society which may explain why Western organizational theory has placed little

emphasis on factors such as history, social setting, culture and government (Boyacigiller & Adler, 1991). Also, Hall pointed out that the level of context influences all other aspects of communication as high-context cultures make a greater distinction between insiders and outsiders than low-context cultures.

Triandis and Albert (1987) held that cultural differences, specifically, Hofstede's (1980) dimensions, had significant implications for organizational communication. They proposed that in high power-distance cultures, communication would be mostly downward, sources would be more influential if they were higher rather than lower in status, and low status audiences would yield to high status sources more unquestioningly. They also held that in low power-distance organizations, there should be more two-way communication. In high uncertainty avoidance cultures, communication would center on rules, norms, and appropriate behavior. While the literature has yet to address the effect of long-term versus short-term orientations on communications, it is reasonable to expect that those cultures focusing on "face" would avoid communications that involve criticisms and questions of ability whereas those focusing on "work ethic" would be more open about failures.

Nakata and Sivakumar (1996), in an integration of the works of Hofstede's (1980) and The Chinese Cultural Connection's (1987) five cultural dimensions, postulated that differing degrees of the five dimensions would be more or less effective during differing phases of product development. However, these propositions are yet to be empirically tested.

U.S./Russia Cultural Differences

Several studies have validated Hofstede's (1980, 1983, 1985) work concerning U.S. culture but little work has been carried out in the prior USSR. These works established that U.S. managers operate in a low uncertainty avoidance, low power distance, masculine, and very highly individualistic culture. A paucity of work exists to study Hofstede's paradigm in Russia or other elements of the prior Soviet Union for obvious reasons. In fact, Hofstede's work included no communist nation with the single exception of Yugoslavia and, in that case, the study was not conducted in the same organization (IBM). Banai and Levicki (1988), based on what was known about the former Yugoslavia, predicted that the USSR culture would yield low power distance, medium scores of uncertainty avoidance, low levels of individualism and high masculinity. Bollinger (1994) studied the values of 55 executives and directors at the Higher Commercial Management School in Moscow. The work was part of a feasibility study to establish a center specializing in management training for

Soviet business executives and directors. Using a "questionnaire . . . based on Geert Hofstede's studies" (p. 50), he found differences between Russian and Western societies, notably: the Russian propensity to high power distance, a high uncertainty avoidance, a collective mentality, and a high degree of masculinity. Comparable works of U.S./Russia culture (in terms of Hofstede's 1980 dimensions) are summarized in Table 2.

Other work that has upheld U.S./Russia differences includes Gudykunst, Stewart and Ting-Toomey (1985) who held that Hall's dimensions of context are isomorphic to Hofstede's individualism/collectivism dimension. Hall's work in the U.S. and the USSR confirmed Hofstede's conjecture of individualism-collectivism in the two countries. Further, research of Ralston, Holt, Terpstra and Kai-cheng (1995), who used the Schwartz value inventory, confirmed wide differences between Russia and the U.S. Still other studies such as Schwartz and Bilsky (1987) and Trompenaars (1994) added to the consensus of wide differences between U.S. and Russian cultures. On the other hand, it is tenuous to draw conclusions given the paucity of replication studies and lack of longitudinal data.

Research on the "least effort" and "richness" of communication sources has taken place in a variety of organizations but the work has been carried out entirely in Western culture. Thus the question arises as to whether the paradigms hold over many cultures.

One inter-cultural investigation by Smith, Peterson and Wang (1996) involved subjects from a broad range of commercial and industrial organizations in the People's Republic of China (PRC) (a high power distance, high uncertainty avoidance and collectivist society), and the U.S. and the U.K. (low power distance, low uncertainty avoidance and individualistic societies). The study examined how managers chose sources of guidance to handle events commonly encountered in almost any managerial role. The events ranged from routine "day-to-day" situations to others representing more significant predicaments. PRC respondents were significantly more likely to rely on rules and procedures and less on themselves or co-workers than the Western respondents. No significant differences were found among the three cultural groups in terms of reliance on one's superior. The Smith et al. study adds another piece of evidence to the question of cultural differences in the workplace.

Yet to be established is the question of what changes, if any, have or will take place as a result of Western and Russian business interactions. Veiga, Yanouzas and Buchholtz (1995) reported a convergence of U.S. and Russian culture in a study of 170 Russian managers that asked three questions about 20 business-related scenarios. These questions were (1) the degree to which the respondent favored such a practice five years ago; (2) the

degree to which the manager favored such a practice now and (3) the degree to which the respondents would favor such a practice five years from now. The authors concluded that their findings upheld Hofstede's (1980) dimensions and demonstrated a convergence of U.S./Russian work values. Still, the claim to convergence of the two cultures may be tenuous as the study was not longitudinal and the findings were based on conjectures of the respondents.

RESEARCH QUESTIONS

Given the dearth of research on cultural issues in Russia and the lack of prior inquiry into cultural differences in scientific and technical information behavior, the study adopted research questions rather than formal hypotheses. These questions address three objectives of the study. First, do differences in information seeking behavior between Russian and U.S. scientists and engineers exist? Second, do Western explanations for patterns of information seeking behavior hold cross-culturally? And, third, do differences in culture explain differences in information seeking behavior?

METHODOLOGY

Subjects were drawn from a random sample of engineers and scientists in Russia's Central Aero-Hydrodynamic Institute (TsAGI) engaged in research, design, and development in the aerospace industry. TsAGI, which had two locations in and near Moscow, had a staffing level of approximately 10,000 of which 6,000 were scientists and engineers. The Institute was yet to be privatized, but it engaged in functions similar to that of the U.S. aerospace industry that included the private sector, NASA, DOD, and the FAA. At the time of the study, TsAGI had established technology-oriented relations with the majority of R&D centers and aircraft manufacturers in the United States, Europe, and Asia.

After follow-ups and adjustments for incomplete and other non-usable returns, the TsAGI sample yielded 209 usable surveys or an adjusted 64% response rate. A prior work by Pinelli, Glassman, Oliu and Barclay (1989) of U.S. subjects (N = 604) was selected for comparison as both studies used comparable subjects (scientists and engineers) working in the same industrial sector. The Pinelli et al. study surveyed a random sample of the membership of the American Institute of Aeronautics and Astronautics (AIAA), a 25,000 member organization of aerospace engineers and scientists employed in the public and private sector. Questionnaire items selected for comparison in this study were identical.

TABLE 2. Hofstede's Indices for Russia and U.S.

Country Investigators	Power distance	Uncertainty avoidance	Individualism	Masculine	Type of study
United States					
Hofstede, 1980	Low	Weak	Individualist	Masculine	Empirical
Russia					
Hofstede, 1993	High	Strong	Collectivist	Feminine	Predictive
Bollinger, 1993	High	Strong	Collectivist	Masculine	Empirical
Banai & Levicki, 1988	Low	Medium	Collectivist	Masculine	Predictive

Eight information sources commonly used by scientists and engineers in R&D (AAES, 1986; Schuchman, 1981) were selected for comparison of the two groups. These sources are: (1) one's own personal store of information; (2) discussion with colleagues/experts within the organization; (3) discussion with one's supervisor; (4) library resources (print media); (5) in-house technical reports; (6) consultation with librarian/technical information specialists; (7) discussion with colleagues/experts outside the organization; and (8) technical information sources, such as online data bases, indexing and abstracting guides, CD ROM products, etc.

ANALYSIS AND DISCUSSION

Table 3 reports the demographic characteristics of the two samples. Chi Square analyses reveal statistically significant differences ($p < .001$) between the two samples. While significant differences exist in terms of work experience, this rests mostly in the distribution of the 11-15 year experience group. But, median years' experience for each group is similar: 17 years for the Russian respondents and 18 years for the U.S. respondents. The U.S. respondents report significantly more (66.6%) graduate degrees than the Russian group (47.4%). And, the U.S. group has a significantly higher proportion of engineers (89.7%) than the Russians (78.5%) and a significantly smaller proportion of scientists (U.S. = 10.3%; Russia = 21.5%). While differences exist, the samples present similar professional composition in similar industries and tasks. Matching samples from different countries is problematic as when samples are matched on some criteria, they are likely to diverge on others (Smith et al., 1996). These differences will be taken into account in the analysis and interpretation of results.

Research Question 1:

Do differences in information seeking behavior between Russian and U.S. scientists and engineers exist?

Table 4 contains preferences for information sources expressed by both groups of respondents. The data demonstrated wide differences between the two sets of respondents in terms of whether a source was used and preferences in terms of the rank ordering of the use of the sources. U.S. respondents followed the anticipated preference for interpersonal communications (Allen and Hauptman, 1994). These rankings were consistent

TABLE 3. Sample Characteristic

	Russia N = 209 n (%)		U.S.[a] (N = 604) n (%)		Chi Square
Professional Work Experience					
0-5 years	9	(4.3)	107	(17.7)	
6-10 years	46	(22.0)	105	(17.4)	
11-15 years	71	(34.0)	59	(19.2)	85.3*
>16 years	83	(39.7)	333	(45.6)	d.f. = 3
Median: Russia = 17; U.S. = 18					
Education					
Undergraduate	110	(52.6)	202	(33.4)	23. 3*
Graduate	99	(47.4)	402	(66.6)	d.f. = 1
Educational Preparation					
Engineer	164	(78.5)	542	(89.7)	16. 3*
Scientist	45	(21.5)	62	(10.3)	d.f. = 1

* $p < .001$
[a] Pinelli et al., 1989

with other studies of U.S. engineers and scientists (AAES, 1986; DeWhirst, 1971; Rosenberg, 1967; Schuchman, 1981). The largest proportion of the U.S. sample (89%) indicated their primary source to solve problems is one's personal store of information, followed by discussions with colleagues/experts in the organization (77%) and discussions with one's supervisor (77%). Lesser used sources (in descending order of use) were print sources such as library resources and in-house technical reports (35% each), then discussions with colleagues and experts outside the organization (25%). The least used sources were library and information specialists (14%) and technical information sources such as on-line data bases, indexing and abstracting services (8%). The data showed a propensity for U.S. scientists and engineers to use the "least effort" model since they relied mostly on their personal resources and interpersonal contacts.

TABLE 4. Use of Information Sources

Source	Russia (N = 209) % (rank)	U.S.[a] (N = 604) % (rank)	Z score
Discussion with colleagues/experts in my organization	90 (1)	77 (2)	4.08*
Library resources, e.g., conference papers, journals, textbooks, and handbooks	85 (2)	35 (4/5)	12.57*
In house technical reports	81 (3)	35 (4/5)	11.49*
Discussion with supervisor	72 (4)	77 (3)	–1.45
Librarian/technical information specialists	59 (5)	14 (7)	12.85*
Used my personal store of technical information including sources in my office	45 (6)	89 (1)	13.17*
Discussion with colleagues/experts outside the organization	36 (7)	25 (6)	3.06*
Technical information sources, e.g., on-line data bases, indexing and abstracting guides, CD ROM products, etc.	30 (8)	8 (8)	7.98*

[a]Pinelli et al., 1989
*$p < .001$

On the other hand, the Russian respondents indicated that in-house discussions with colleagues/experts were used most frequently (90%), followed by print media such as library resources (85%) and in house technical reports (81%). Next, 72% reported use of discussions with their supervisors while 59% stated they used librarian/information specialists. The least used sources were one's own personal store of information

(45%), discussion with colleagues/experts outside the organization (36%), and technical information sources (30%). In general, the Russian scientists and engineers used multiple sources whereas the U.S. group used far fewer. In all cases, except discussion with supervisors, the percentage of U.S. respondents using any one source was significantly less than the Russian group ($p < .001$). Also, the U.S. group relied on personal knowledge and resources significantly more than their Russian counterparts when solving a problem.

The Russian sample contained a much larger proportion of scientists (21.5%) than the comparison study of Pinelli et al. (1989) that had 10.3% scientists in the sample. To ensure that the findings were not contaminated by differences in the make-up of the two samples, t-tests of the use and non-use of each source found no significant differences ($p > .05$) in choice between the engineers and scientists. This supported the contention that the differences in source predisposition are not a function of differing proportions of scientists and engineers. Thus, the analysis turns to research question 2 that explores the question of whether Western thought on information seeking may be culturally bound.

Research Question 2:

Do Western explanations for patterns of information seeking behavior hold cross-culturally?

The data in Table 3 upheld, to some extent, the "law of least effort" with higher preferences given to interpersonal (as opposed to written) sources (Table 3); however, the Russian group relied far more frequently on print media than their U.S. counterparts. The contingency approach using the "richness" criterion could not be tested in any depth using the approach suggested by Daft and Lengel (1984). However, it was clear that the Russian group made significantly more use of print media and library and technical information sources rather than personal contacts. This most likely cannot be attributed to Daft and Lengel's "routineness" dimension as it was unlikely that the Russian group was far more likely to deal with routine problems and the U.S. sample was more likely to deal with non-routine issues.

Overall, little evidence could be found to uphold the universality of current theories of information seeking that have been developed wholly in Western cultures.

Research Question 3:

Do differences in culture explain differences in information seeking behavior?

Explanation of the differences in source preferences may be interpreted in part by Triandis and Albert's (1988) suggestion that in high power-distance cultures, information sources may be preferred if they are higher in status. This partly explains the preference of Russian engineers and scientists for print media over contacts outside the organization. Further, in high-power distance countries, organizations tend to be hierarchically structured (Hofstede, 1991), which discourages individual initiative, thus probably resulting in a lower priority on reliance on personal stores of information in the Russian group. This confirmed the proposition that U.S organizations rely on and reward individual initiative rather than central planning (Smith et al., 1996). The partiality of U.S. respondents for interpersonal communications is consistent with the contention that in low power-distance organizations, there is more two-way communication. Another line of reasoning might view the use of multiple sources and high use of documentary sources by Russian respondents as a means of avoiding risk–a characteristic of an uncertainty avoidance society.

While both cultural groups express a high propensity for personal contacts in solving technical problems, the Russian group resorts more frequently to print media, rather than personal contacts with colleagues outside the organization. Consistent with their use of multiple sources, Russian respondents reported more outside contacts, but in the U.S. group, outside contacts enjoyed a higher priority. One potential reason may rest in the collectivist nature of the Russian culture that frowns on use of outsiders and their view of information as a resource not to be shared with outgroups. A second explanation may rest in the higher education and higher job mobility of the U.S. sample. The U.S. group had far more graduate degrees than the Russian group. However, any strict comparisons may be tenuous as advanced degrees in the USSR (as well as Europe) are organized differently from U.S. masters and doctorates (Kresin, 1988). Both samples reported similar median years in the profession but it isn't unreasonable to assume that personal mobility of the Russian group was severely limited for most of their careers under the prior political regime. This follows Price's (1970) observation about oral communication networks that are sustained by personal relations and the related contention of Langrish et al. (cited in Parnoff, 1981) that career mobility and education are the most effective ways of ensuring dissemination of new technology. Due to the lack of career mobility and lower levels of education, Russian

scientists probably have developed fewer outside contacts in the scientific and engineering community and thus, rely more on print sources.

Given the high power distance of the Russian culture and the low power distance ascribed to U.S. culture, one might have expected differences in the proportion who approached their supervisor for help. This was not the case, with the U.S. respondents reporting a higher (77%) use (but not significantly different) compared to 72% among the Russian respondents. The findings are consistent with the work of Smith et al. (1996) who also found no significant differences between managers in the PRC, U.S. and U.K. in consulting supervisors when solving managerial problems. This is problematic in that former Communist nations have been characterized as low freedom, collectivist, and high equality (Triandis, 1996), whereas the U.S. may be described as high freedom, individualistic, and equity oriented. An alternative non-culture based explanation may rest in similar perceptions of the "costs" subordinates may incur by admitting their lack of knowledge.

The data in this study provide evidence to uphold the contention that different cultures employ dissimilar patterns in seeking information. The findings uphold the work of Smith et al. (1996) that compared information source choices of managers in the PRC (a country whose cultural characteristics reflect values of Russia) and U.S. and U.K. managers. Further, comparing the results of a similar work of Smith et al. (1996), which focused on managers, suggests that information patterns hold within a culture and are not necessarily a function of the job (manager as opposed to scientist or engineer).

IMPLICATIONS AND FUTURE RESEARCH

This study found wide differences in information seeking behavior between U.S. and Russian scientists and engineers. It must be pointed out that the present study has several limitations. First, the study relies solely on survey self reports rather than personal interviews, observations, or diaries or any combination of the four methods. On the other hand, this being an international study, observers, interviews and diaries used in some communications research were not feasible. A related issue is the use of simple yes/no responses rather than frequencies of use, rank ordering, or Likert scaling. Still, this simple dichotomy may avoid the tendencies of certain cultures toward extreme ends of a scale. Second, the time lag between the two studies may overlook longitudinal changes. However, the Russian group was the more recent of the comparison groups. Thus, if any changes in cultural orientation were to be postulated, it would be of

the Russian converging to Western culture rather than the converse. Third, the two samples were not exactly matched yet these obstacles will not easily be overcome as long as intercultural studies involve countries with differing infrastructures. On the other hand, the intercultural differences found in this study were consistent with the work of Smith et al. (1996).

The findings uphold Subramanyam's (1981) contention that although scientific information may be, to a great extent, supranational and mostly transcending political and cultural limits, there may be vast differences in language and physical medium. Perhaps more importantly, the findings point out the potential fallacy of extending U.S. management practices to other cultures. This study found that concepts of "least effort" and "information richness" as determinants of information seeking behavior do not hold in Russian culture. The next issue involves organizational structures (that are closely tied to culture) and how these structures aid or impede effective problem solving in different cultures (e.g., explanations of preference for accessibility such as suggested by O'Reilly, 1982). Nevertheless, far more research is needed using similar methods and matched samples before assuming or denying that what has been found in the U.S. culture is exportable to other cultures.

Still another consideration rests in the contentions of convergence theory that holds that as nations interact, national values, and thus managerial practices, will become more alike. In the case of Russia, as well as other former Soviet bloc countries, this is problematic given the fairly recent breakup of the USSR, and the dearth of cultural research in Eastern bloc nations. As cultural research is relatively new, longitudinal studies are badly needed.

Another issue is one of import to both researchers and managers and that is the question of the efficacy of the competing ways of solving technical (and managerial) problems. Need exists for intercultural investigation to determine what, if any, methods are the more efficacious or, alternatively, under what contingencies is one approach superior to another. If one method is found to be universally superior to another, regardless of culture, this has serious implications for managers of multinational endeavors as this will involve attempting to change the behaviors of the participants. On the other hand, should efficacy of information seeking methods be culturally determined, then managers might take advantage of both cultures such as suggested by Nakata and Sivakumar (1996) who suggested that differing cultural orientations would be more or less effective during differing phases of product development. A second example may rest in the Russian scientists' and engineers' propensity to resort to print sources that may alleviate the need for joint venture partici-

pants to rely heavily on technological gatekeepers. Conversely, the U.S. tendency to use informal contacts could contribute to project efficiency in terms of the information timeliness.

Another managerial consideration is the choice of business alliance partners. Nakata and Sivakumar (1996) noted that selection is frequently based on considerations such as technology, financial resources, logistics and market access whereas national culture is frequently overlooked. Finally, many U.S. firms have undertaken programs to educate their international partners in Western managerial concepts without considering the practices of a country about which they know little. The question of whether deep cultural differences will remain or whether an international culture of work practices will emerge is still one that can only be answered at a time in the future as business moves further into internationalization.

NOTE

1. "Ingroups" in this discussion are defined as mostly, but not necessarily confined to, organizational members (co-workers or colleagues), but also may include schoolmates, friends, and acquaintances (Gudykunst et al., 1987).

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